

**REMARKS**

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

In the Office Action, the Examiner rejected claims 1-10 under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 6,122,910 to Hoshi et al (“Hoshi”). Also, the Examiner rejected claims 1-10 under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 6,516,612 to Yokoi et al (“Yokoi”). In response to the Office Action, Applicant respectfully requests amendment of the claims and respectfully traverses.

**Summary of Amendments**

Claim 1 is hereby amended to include the limitations of original claim 5. Specifically, amended claim 1 now further recites that the second emission reduction element has a lower operative temperature formulation than the first emission reduction element. Correspondingly, claims 5 and 11 have been cancelled, and claim 10 has been amended to be placed in accordance with amended claim 1. Applicant asserts that no new matter is added by these amendments.

**Claims 1-10 rejected under 35 U.S.C. § 102(b)**

Claims 1-10 stand rejected under 35 U.S.C. § 102(b) as anticipated by Hoshi. As amended, independent claims 1 and 10 now include the limitation that the second emission reduction element has a lower operative temperature formulation than the first emission reduction element.

Applicant respectfully traverses the Examiner’s assertion on the basis that the Hoshi reference does not include all of the limitations as claimed. Specifically, the Federal

Circuit has held that “anticipation under 35 U.S.C. § 102 means lack of novelty, and is a question of fact. To anticipate, *every element and limitation* of the claimed invention must be found in a single prior art reference, *arranged as in the claim.*” *Brown v. 3M*, 265 F.3d 1349, 1351 (Fed. Cir. 2001) (emphasis added). Thus, to form a proper rejection under 35 U.S.C. § 102(b), the Hoshi reference must include each and every element and limitation of the claim as arranged.

Thus, Applicant respectfully asserts that the Hoshi patent does not disclose, teach, or suggest an emission reduction apparatus for an engine exhaust, wherein a second emission reduction element has a lower operative temperature formulation than a first emission reduction element. In the Office Action, the Examiner asserts that Figures 1-16, columns 30-34, and lines 1-67 of the Hoshi patent disclose a second emission reduction element having a lower operative temperature formulation than the first emission reduction element.

Hoshi discloses (Figure 1) an exhaust purifying apparatus which purifies an unburnt gas component such as unburnt hydrocarbon (“HC”) which is discharged from an internal combustion engine 1, and prevents the unburnt HC from being discharged into the atmosphere. The exhaust purifying apparatus comprises two exhaust passages 4 and 5 which merge into a single joint passage 6. Each of the individual exhaust passages has an absorption/desorption unit which includes a three-way catalyst 7 and 8 respectfully. A further three-way catalyst 9 is provided in joint passage 6. A desorbition/adjustment mechanism is provided to synchronize the timing of the unburnt gas components which are emitted from the first and second three-way catalysts 7 and 8, so that they reach the third three-way catalyst 9 at the same time.

As described, none of the emission reduction elements found in Hoshi are regenerable emission reduction elements. Instead, they are standard three-way catalysts. Standard three-way catalysts are not regenerable emission reduction elements. For example, in operation, when a three-way catalyst is below a certain temperature, unburnt HC in liquid form will stick to its surface, and when the catalyst then reaches a predetermined higher temperature, the unburnt HC will leave its surface in gaseous form. That is, unlike the first and second regenerable emission reduction elements of the present disclosure, the impurities which gather on the standard three-way catalysts in Hoshi will remove themselves at a later point during operation, such that there is no necessary regeneration scheme associated with those catalysts.

As amended, claim 1 of the present application includes the limitation, wherein the second emission reduction element has a lower operative temperature formulation than the first emission reduction element. Significantly, the asymmetrical capacity of the two traps in claim 1 may give rise to a corresponding asymmetrical operating cycle in which the larger trap will remain operative for a longer period of time than the smaller trap. This, in turn, may lead to a temperature asymmetry as the temperature of the larger trap will build up during its emission reduction period and also during the correspondingly longer regeneration period. To further harness and exploit this asymmetry of the system, the second regenerable emission reduction element is designed to have a lower operative temperature formulation than the first emission reduction element. The result is that the second regenerable emission reduction element actually benefits from having its temperature lowered with respect to the first element and in fact may have an increased storage capacity at this lower temperature, which gives rise to increased conversion efficiency.

In lieu of the above, Applicant respectfully asserts that Hoshi does not disclose, suggest, or teach, *inter alia*, an emission reduction apparatus wherein the second emission reduction element has a lower operative temperature formulation than the first emission reduction element. Additionally, Hoshi does not disclose, suggest, or teach an emission reduction apparatus that exploits the asymmetrical operating cycle of the first and second emission reduction elements. Therefore, Applicant respectfully requests that the rejection under 35 U.S.C. 102(b) be withdrawn and claims 1 and 10 be placed in condition for allowance. Furthermore, as dependent claims 2-9 all properly depend from independent claim 1, and are therefore narrower in scope, they are patentable for at least the same reasons.

Claims 1-10 rejected under 35 U.S.C. § 102(e)

Claims 1-10 stand rejected under 35 U.S.C. § 102(e) as anticipated by Yokoi. As amended, independent claims 1 and 10 now include the limitation that the second emission reduction element has a lower operative temperature formulation than the first emission reduction element.

Applicant asserts that the Yokoi patent does not disclose, teach, or suggest an emission reduction apparatus for an engine exhaust, wherein a second emission reduction element has a lower operative temperature formulation than the first emission reduction element. In the Office Action, the Examiner asserts that Figures 1-9, columns 5-6, and lines 1-67 of the Yokoi patent disclose a second emission reduction element having a lower operative temperature formulation than the first emission reduction element. Applicant respectfully traverses the Examiner's assertion on the basis that the Yokoi reference does not include all the limitations as claimed.

In contrast, Yokoi merely discloses an exhaust gas purification device including two three-way catalysts connected to engine cylinder groups and arranged in parallel, and a NO<sub>x</sub> trapping catalyst connected with the two three-way catalysts and downstream thereof. When it is necessary to reduce the NO<sub>x</sub> trapped by the NO<sub>x</sub> trapping catalyst, a controller increases fuel injection into one of the three-way catalysts, making its air-to-fuel ("A/F") ratio rich relative to a stoichiometric A/F ratio. According to one embodiment of Yokoi, the first three-way catalyst has a smaller volumetric capacity than the second three-way catalyst because it has a lower oxygen trapping property than the larger catalyst. As a result, it will consume less fuel, leaving more fuel to reach the rear NO<sub>x</sub> catalyst in order to regenerate it.

As described above with reference to Hoshi, the two three-way catalysts in Yokoi are not regenerable emission reduction elements. Specifically, Yokoi discloses two non-regenerable three-way catalysts and a single NO<sub>x</sub> trap (*i.e.*, the only regenerable emission reduction element disclosed by Yokoi). Thus, Yokoi discloses a system including a single regenerable emission reduction element (*i.e.*, the NO<sub>x</sub> trap), and two non-regenerable catalysts. As such, Yokoi does not disclose, suggest, or teach each and every element of the present disclosure as required to form a proper rejection under 35 U.S.C. § 102(e). *See 3M*, F.3d at 1351. Therefore, Applicant respectfully requests that the rejection under 35 U.S.C. § 102(e) be withdrawn and claims 1 and 10 be placed in condition for allowance. Furthermore, as dependent claims 2-9 all properly depend from independent claim 1, and are therefore narrower in scope, they are patentable for at least the same reason.

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number

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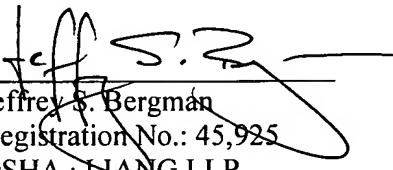
listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 04630/032001).

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 50-0591, under Order No. 04630/032001 from which the undersigned is authorized to draw.

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Respectfully submitted,

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